

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Interactive Presentations - IAF SPACE EXPLORATION SYMPOSIUM (IP)

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2-DIMENSIONAL SIMULATION OF ELECTROSTATIC DUST LOFTING ON THE LUNAR  
TERMINATOR

**Abstract**

The lunar horizon glow (LHG) was first spotted during Surveyor missions, and Apollo astronauts reported that they had seen the excessive brightness as well. It has been suspected that the LHG was produced by the electrostatically transported lunar dust grains, and the laboratory experiments demonstrated that the dust particles can be mobilized electrostatically by the repulsion between the neighboring grains and the surface electric field. In addition, the main charging mechanism is determined to be the emission and re-absorption of the electrons within the small gaps between the particles. Previously, the lunar dust lofting was simulated by considering only the vertical motion in our studies, and the proposed equations were confirmed by the experiments on silica particles with the sizes between  $< 6$  and  $45 \mu\text{m}$  in the vacuum chamber. In this study, the simulations are improved by considering the dust launching angles that are observed during the experiments, the variation of the contact forces due to the shape irregularities and the charge-to-mass ratio of the lofted dust grains. Therefore, the results of the estimated dust trajectories, the rotation of the lofted dust grains and the variation of charge-to-mass ratios will be reported for the lunar dust grains with the sizes of submicron to micron range under the regular solar wind conditions. Finally, the simulations are being improved in order to advance our understanding of the electrostatic dust mobilization and transportation as well as to estimate the dust heights for a future CubeSat mission by Kyushu Institute of Technology to observe the LHG.